Bridging Science and Values
A Unifying View of Mind and Brain

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ABSTRACT: *The traditional dichotomy that has separated science and value judgment and set corresponding limitations to the domain and role of science is challenged in the context of recent developments in the concept of consciousness and mind–brain relations. A conceptual explanatory model for psychophysical interaction has emerged during the past decade that changes the scientific status of subjective experience and negates many mechanistic, deterministic, and reductionistic features of prior materialist–behaviorist doctrine. Subjective values, conceived in the present terms, transcend their neural components in brain function to become causal determinants per se with objective consequences. The strategic control power of human values functioning as universal cerebral determinants in all social decision making is emphasized, along with logical indications for a more active involvement therein on the part of science.*

General acceptance of the inadequacy of science in the realm of ethical and moral judgment is reflected in the old adage that "Science deals with facts, not with values" and its corollary that "Value judgments lie outside the realm of science." In other versions it is stated that science may show us *how* but not *why*, or how to achieve defined goals but not which are the right goals to aim for. A further pronouncement holds that science can tell us what *is* but not what *ought* to be, or that science describes but cannot prescribe.

Although this time-honored dichotomy between science and value judgment has not gone unchallenged (Bahm, 1974; Burhoe, 1969; Cattell, 1972; Kluckhohn, 1959; Sperry, 1972), the great majority in science, philosophy, and related fields continue today to accept in principle the tradition that science as a discipline must by its very nature deal with objective fact, and that science, either as a method or as a body of knowledge, can neither prescribe values nor resolve issues in the realm of subjective value. When it comes to value conflicts, we are told that we must seek our answers elsewhere—in the humanities, in ethics and philosophy, and particularly in religion, long held to be the prime custodian of human value systems. The basic validity of this traditional separation of science and values and the related limitations it has imposed on the role of science are open to question in the context of current mind–brain theory.

Value Problems in Scientific Perspective

Human values, in addition to their commonly recognized significance from a personal, religious, or philosophic standpoint, can also be viewed objectively as universal determinants in all human decision making. All decisions boil down to a choice among alternatives of what is most valued, for whatever reasons, and are determined by the particular value system that prevails. Human value priorities, viewed thus in objective control-system theory, stand out as the most strategically powerful causal control now shaping world events. More than any other causal system with which science now concerns itself, it is variables in human value systems that will determine the future.

As a social problem, human values can be rated above more tangible concerns like poverty, pollution, and overpopulation on the grounds (a) that these more concrete conditions are all man-made and are very largely products of human values, (b) that they are not correctable on any long-term basis without effecting changes in the underlying human values involved, and further, (c) that the

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strategic way to remedy such conditions is to try to actively correct the social value priorities in advance, rather than waiting for the corrective changes to be forced by worsening external conditions. Otherwise, we are destined to live continuously on the margins of tolerability, because it is not until things threaten to become intolerable that the voting majority gets around to changing its established values. These and related considerations suggest the desirability of a more active scientific approach to this master control, the human value factor.

From the standpoint of brain function, it is clear that a person's or a society's values directly and constantly shape its actions and decisions. Any given brain will respond differently to the same input and will tend to process the same information into quite diverse behavioral channels depending on its particular system of value priorities. In short, what an individual, or a society, values determines very largely what it does. As human numbers increase and science and technology advance, the regulative control role of the human value factor, which directly determines how all the increased human impact will be applied and directed, becomes correspondingly more powerful.

In a different vein, we are informed that the prevailing social neurosis of our times is a growing sense of valuelessness, apathy, hopelessness, and loss of purpose and higher meaning. We are reminded of the generalized disintegration of long-established values and belief systems, the grasping in all directions for new answers and new lifestyles, and the reviving in radical form of some of the old answers. From other directions come warnings that the world community needs a whole new system of social value guidelines if civilization is to survive, "new ethics for survival" as Hardin (1972) puts it, that would act to preserve our world instead of destroying it.

In view of the enormous timely importance and control power of human values and their critical role in shaping world events, it follows that if science is inherently inadequate by its basic nature to deal with values and value issues, then we are confronted (as antiscience asserts) with what is surely a profound shortcoming in science and all it stands for. On these terms, it is understandable that government should be tightening the screws on the funding of science, especially pure science, and that the overall intellectual confidence in science generally should be in decline while the forces of antiscience gain new ground through the writings of critics such as Roszak (1973) and Mishan (1969). The future of science will be very different depending on whether or not science is recognized in the public mind to have competence in the realm of values. Reciprocally, the future of society also will be very different depending on whether its value perspectives are shaped from science and the world view of science or by alternative forces that now prevail.

Grounds for Reappraisal

While the separation of science and values seemed to have logical justification in the past, and still does with respect to certain aspects of scientific methodology, new grounds can be seen today that directly challenge the basic philosophic validity of the science–values dichotomy. Recent developments, especially in the behavioral sciences, reopen central issues and argue for a revised philosophy in which modern science becomes the most effective and reliable means available to the human brain for determining the ultimate criteria for moral value and meaning (Sperry, 1972). Problems of values, ethics, and morality (questions, that is, of what is good, right, and ethically true and of what ought to be) become, in these revised terms, something to which science can, in the most profound sense, contribute fundamentally and in which science should be actively and responsibly involved.

Although similar proposals since the time of Francis Bacon have been largely written off as scientism by detractors, conceptual developments during the last decade have introduced an interpretation of conscious mind and a resultant philosophical framework that substantially alter the picture. The relation of subjective values to objective science, the scientific status of values, and the kinds of human values supported by science are all directly affected. In essence, our current modified concept of the mind–brain relation endows the phenomena of conscious experience with an active causal role in brain processing (Sperry, 1969, 1976b), in direct contradiction to the central founding precepts of Watsonian behaviorism and of 20th-century scientific materialism generally. Important departures from long-established determinist and materialist doctrine follow, with extensive implications for the philosophy of science and the derivation of values.

The involved theoretical changes have been outlined extensively elsewhere (Sperry, 1970, 1976a,

976b, 1977) and may be reviewed briefly as follows: We reject prior theories of consciousness which interpret subjective experience to be (a) an epiphenomenon; (b) an "inner aspect" or any form of passive, parallelist "correlate" of brain activity; or (c) identical to neural events as in "psychophysical identity theory." Conscious phenomena in our revised model are "different from, more than, and not reducible to" neural events—though built of neural and perhaps glial and other physico-chemical events as elements. We also reject the view (d) that consciousness is a pseudoproblem conjured into our thinking as an artifact of semantics that can be resolved with a proper linguistic approach. Bypassing all the foregoing, we center in on the interpretation of consciousness as an emergent property of brain activity, as upheld especially by the Gestalt school of psychology in ideas that peaked during the 1930s and early 1940s under Koffka (1935), Köhler (1929; Köhler & Held, 1949), and others (see Boring, 1942).

The present model is distinguished from the earlier emergent Gestalt concepts in that, first, the emergent properties are not conceived to be correlated with, nor derived from, cortical electric field or volume current conduction effects but are conceived rather in terms of traditional nerve-circuit and cerebral-integration theory. Second, the present model does not require isomorphic or topological correspondence between the emergent subjective properties and the neural events. Subjective meaning is conceived to derive rather from the functional or operational impact or the way a given brain process "works" in the context of brain dynamics (Sperry, 1952).

Third, while agreeing with Gestalt theory that conscious phenomena are not reducible to neural events, the current view does not take the extreme Gestalt position that categorically rejects analysis and explanation in terms of the parts. In the present view, a description of the neural events generating any conscious experience would have tremendous explanatory value and would seem to constitute the best hope for advancing understanding. Fourth, and most important, the emergent properties in the present view are not interpreted to be mere passive parallel correlates, aspects, or by-products of cortical events, but rather to be active, causal determinants essential to the control of normal cerebral processing.

A conceptual explanatory model is provided, in principle, for the way mind can rule matter in the brain and exert causal influence in the guidance and control of behavior, on terms acceptable to neuroscience and without violating monistic principles of scientific explanation. No direct empirical proof is available, of course, but neither is there proof available for the traditional behaviorist–materialist position. It comes down to a balance in credibility, all things considered, and one can only say that many of us have come increasingly during the past decade to regard this modified causal concept of conscious mind as being more credible on several counts than the behaviorist view.

No dualistic interaction in the classical sense is implied. The causal power attributed to the subjective properties resides in the hierarchical organization of the nervous system and in the power exerted by any whole over its parts. Mind moves matter in the brain in much the same way that an organism moves its component organs and cells or a molecule governs the travel course of its own atoms, electrons, and subnuclear elements in a chemical reaction. In the case of conscious experience, it is the dynamic system properties of high-order cerebral processes that control their component neural and chemical elements. Holistic, emergent, or system properties elsewhere are recognized universally to have causal efficacy. The present view merely asserts that the emergent subjective properties of brain processing are no exception to the general rule. The principles of inter-level causal control envisaged have been recently expounded upon by Pols (1971, 1975).

The present view differs from earlier concepts in that the brain–behavior sciences can no longer ignore subjective conscious experience and expect to obtain, in principle, a complete objective description of higher, psychological functions. The conscious properties, per se, are conceived to make a profound difference in the course of neural events. Subjective experience in the present scheme is put to work in brain function and given a reason for being and for having been evolved in a physical system. Stemming largely from efforts to account for the inferred unity and/or duality of subjective awareness in the presence or absence of the cerebral commissures (Sperry, 1966, 1977), this modified approach to the mind–brain interface brings together selected features of prior materialist, mentalist, emergent, and pragmatist doctrines in a novel combination. The result, in effect, means that the whole value-rich, qualitative world of inner, conscious, subjective experience (the world of

the humanities), which has long been explicitly excluded from the domain of science on behaviorist–materialist principles, becomes reinstated.

The science–values dichotomy is directly affected in two ways: (a) Subjective values are in principle no longer excluded from the realm of experimental science and scientific method, and (b) the world view of science, and hence the kinds of human values supported by science, are greatly altered in humanistic quality. These two factors, taken singly and in combination with their ramifications and implications, revise and directly counter prior arguments for keeping "value judgments outside the realm of science."

Revised Outlook

The involved change in the scientific status of conscious mind carries with it a renunciation of much of the mechanistic, behavioristic, deterministic, and reductionist thinking that formerly had characterized science and that the humanities have always found difficult to accept and relate to. Behavioral science in particular acquires a new look in this respect and becomes much more subjectivist and humanistic. Recent trends in psychology, referred to variously as the "humanist," "cognitive," or "third" revolution, or simply as the "new psychology," are more than just a matter of changing attitudes in science or a reflection of passing social trends. They have authentic theoretical grounding in fundamental changes in our basic mind–brain concepts.

On the above terms it becomes increasingly impossible, among other things, to accept the idea of two separate realms of knowledge, existence, or truth: one for objective science and another for subjective experience and values. Old metaphysical dualisms and the seemingly irreconcilable paradoxes that have prevailed in psychology between the realities of inner experience on the one hand and those of experimental brain research on the other (Wann, 1965) disappear into a single, continuous hierarchy. Within the brain, we pass conceptually in a hierarchical continuum from the brain's subnuclear particles, on up through the atoms, molecules, and brain cells to the level of nerve-circuit systems without consciousness, and finally to cerebral processes with consciousness. Objective facts and subjective values become parts of the same universe of discourse. The hiatus between science and values is erased in part by expanding the scope of science to encompass inner experience and by altering the status of subjective values so that they are no longer set off in an epiphenomenal or other parallelistic domain outside the reach of science.

(So long as science disclaims and rejects on principle the entire realm of inner subjective experience as being acausal, the content and world view of science remain inadequate and unsatisfying for answers that involve subjective value.) With the acceptance of a causal concept of conscious experience, the qualitative subjective dimensions in value systems no longer exclude a scientific approach; nor are these subjective dimensions necessarily neglected or demeaned. The scientific image of man regains much of the freedom, dignity, and other humanistic attributes of which it has long been deprived. Many prior antiscience objections to the mixing of science and values no longer apply. A holistic world model and interpretation of reality is also supported in which the qualitative pattern properties of all entities are conceived to be just as real and causally potent as are the properties of their elements or their quantitative measurements and abstractions. This preservation of the qualitative value and pluralistic richness of physical reality stands counter to the common tendency (Roszak, 1973) to correlate science with reductionism.

Further Implications

A substantially altered picture of causal determinism in behavior is now inferred (Sperry, 1964, 1966, 1976b) in which all subjective mental phenomena, including subjective values, are recognized to have a causal role per se in the decision-making process, rather than being mere correlates or aspects of a self-sufficient brain physiology. In any decision to act, the conscious mental phenomena override and supersede the component physiological and biochemical determinants. Even subjective feelings about projected outcomes anticipated to result from a given choice as far as 25 or 100 years in the future may be entered proactively as causal determinants in the cerebral operations that lead to a given choice. Behavior on these terms is still causal and deterministic but at a cognitive and conative, mental (rather than mechanistic or physiological) level. Total freedom from causation would result in meaningless, random chaos and would be as bad or worse than mechanistic determinism. Current theory provides a compromise that allows one to determine one's own actions according to one's own

objective wants, personal judgment, perspectives, cognitive aims, emotional biases, and other mental inclinations. The degree and kinds of freedom of choice introduced thereby into the causal sequence of decision making clearly set the human brain apart, at an apex post in the universe above all other known systems, in its ability to choose and control a course of events.

The concepts raised in the foregoing sections are central and basic to ethics and value theory. Value priorities, especially in the ideological, religious, and cultural areas, are heavily dependent, directly or by implication, on concepts and beliefs regarding the properties of conscious mind and the kinds of life goals and world views which they allow. Directly and indirectly, social values depend on whether consciousness is believed to be mortal, immortal, reincarnate, or cosmic, and whether consciousness is conceived to be localized and brain-bound, essentially universal—as in panpsychism or Whiteheadian theory—or perhaps capable of "supracoalescence" in a megamind. Where formerly there were seemingly unlimited degrees of freedom for speculation in these areas, advances in neuroscience continue to narrow the latitudes for possible realistic answers. In modern neurophysiology, it is not so much a question of whether conscious experience is tied to the living brain, but rather to what particular parts of the brain, or to which neural systems and under what physiological conditions (Doty, 1975; Eccles, 1973; Libet, 1973).

As the brain process comes to be understood objectively, all mental phenomena, including the generation of values, can be treated as causal agents in human decision making. The origins, directive potency, and consequences of values all become subject, in principle, to objective scientific investigation and analysis. This applies at all levels, from that of the brain's pleasure–pain centers and other reinforcement systems on up through the psychosocial, economic, and related forces that mold priorities at the societal, national, and international planes. Modern behavioral science already treats value variables and their formation as important causal variants in behavior, and it also deals analytically with goals, needs, motivation, and related factors at individual, group, and societal levels. What amounts to a science of values in the context of decision theory becomes conceivable (Bahm, 1974; Pugh, in press; Sperry, 1972), extending into all branches of behavioral science and forming a skeletal core for social and behavioral science. For neuroscience it suggests a design principle for understanding brain organization and cerebral processing as a goal-directed, value-guided decision system, replacing older "stimulus–response" and "central switchboard" concepts that arose out of spinal cord physiology.

"Is" Versus "Ought"

On the foregoing terms, most remaining traditional objections to the mixing of science and values tend to disappear. Probably the most influential factor currently sustaining the science–values dichotomy is the prevailing acceptance of the contention of professional philosophy that it is logically impossible to determine what *ought to be* from what *is*, or to derive ethical priorities from objective facts. I think this off-cited dictum has never been defensible from the standpoint of behavioral science (Sperry, 1966, 1972) and is best appraised as a logical artifact of a strictly pencil-and-paper approach in philosophy. Human values are inherently properties of brain activity, and we invite logical confusion in trying to treat them as if they had independent existence artificially separated from the functioning brain. In the operations of the brain, incoming facts regularly interact with and shape values. The two interact as cofunctions in the building of one's sense of value. The resultant value system of any adult or society, along with related conceptions of what ought to be, is determined in very large part by the body of facts encountered. In terms of cerebral processing, it is difficult to see a better way to determine "what ought to be" than on the basis of factual information, especially facts and deductions therefrom that have been scientifically verified. History and common observation confirm that nothing is more proficient than science for prescribing what ought to prevail in order to achieve most any defined aim, whether this be a landing site on Mars, improved health, or whatever. The same applies in regard to ultimate aims and is discussed in the final section of this paper.

In the processing of factual input, the brain mechanisms already are richly equipped in advance with established value determinants and intrinsic logical constraints in the form of innate and acquired needs, aims, and motivational and other goal-directed factors that have their origins partly in biological heritage and partly in prior experience and that may also come through formal acceptance of ethical axioms. Particularly pertinent

is the largely inherent need of the human brain to try to perceive meaning, including that for its "self" in the long term. Since, in practice, it is never a matter of deriving values from extrinsic facts per se, the question at issue may be framed more properly in terms of the impact of a set of facts upon ongoing brain processes. Accordingly, if one asks whether a set of facts can shape value priorities or one's judgment of what *ought* to be, the answer, of course, is yes. We are constantly adjusting our ethical values to conform with new factual information, and the advance of science historically has always had a deep inevitable influence on human value-belief systems.

For present purposes, the innate primal system of values that is based in biological survival (Pugh, in press) and is part of human nature, the personal, interpersonal, and "humanitarian" aspects of which tend to form a large common denominator for all ethical systems, is treated here largely as a constant. The present focus is on areas where ethical systems disagree and particularly on those cognitive, axiological, and related variables that are affected by acceptance or rejection of the method and world view of science as a final frame of reference. It is in this cognitive, rational realm that most major value conflicts and ideological differences are found. The further, related problem of the prime determinants and starting axioms and premises in ethical systems is considered separately below.

Other convergent lines of reasoning can be seen that support the same conclusions reached here regarding the potential role of science in shaping values, so that if the current mind–brain model is shot down, these conclusions still hold up on other grounds. Common sense dictates that science, as man's number one source of factual information, should be enlisted in the realm of value judgment on the simple rationale that an informed judgment is generally preferable to one that is uninformed or misinformed. Similarly, if moral judgments about right and wrong are best arrived at on the basis of what is true, avoiding what is false, science would seem on this count as well to deserve a leading role in shaping ethical values instead of being disqualified. The reference throughout this paper to science is not to individual scientists or their personal opinions and values but rather to the total collective knowledge and world model drawn from all the sciences, including the social and political, and to the insight, understanding, and sense of value fostered by this total collective (the nearest thing to omniscience available to human society and the overall perspectives of which may often be better reflected in the thinking lay citizen than in the scientific specialist). The reference also is to the relative validity, credibility, and reliability of the scientific method itself as an approach to truth so far as the human brain can know it.

A quite different argument has renounced any active approach to ethics through science, not because social values should be left to the humanities, the church, or to Marx, but rather on grounds that it is wiser that values be left to themselves to change spontaneously, by collective intuition, as it were, in response to changing environmental conditions. Some economic realists assert that this is the only way that values change, and they eschew any moral philosophizing or prescriptive idealizing, viewing it as ineffectual. This stance overlooks the strong reciprocal interaction between mental concepts and environmental conditions and the tremendous impact that ideology and value systems have always had on the course of human history. It overlooks also the fact that social values formed on this situational-feedback basis as a reflection of prevailing conditions tend to be locked in a democratic society to levels of bare tolerability rather than to ideal optimums, for reasons already mentioned.

It is not only the value systems of orthodox religion that have been found wanting today, but also those based on humanist, communist, existential, and even common humanitarian principles. Recourse to recent alternatives like the "lifeboat" ethic or the battlefront ethic of triage, as currently formulated, hardly offers inspired solutions. Current world conditions call for a unified global approach with value perspectives built on something higher than just the human species or its societal dynamics, something more godlike that will include the welfare of the total biosphere and ecosystem as a whole on an evolutionary time scale. The greater the human impact on the ecosystem, the more urgently these higher perspectives are needed. They are imperative also in efforts to perceive higher meaning, where it becomes a logical necessity that humanity be able to perceive itself in terms of a meaningful relation to something more important than itself.

Science and the Prime Determinants

The more critical value issues that must be faced in the near future will involve decisions that

ultimately require appraisals of the relative worth of human life in various contexts. For example, as world crowding conditions get tighter, the value of human life must be balanced increasingly against that of other species. Having already destroyed the natural meaning and dignity of life for a number of subordinate species and permanently extinguished others, man will be forced to judge how much further species' rights can be ignored and by what ethic. Many more examples can be listed in which scientific advancements, coupled with mounting population and related pressures, have raised a growing host of moral dilemmas that revolve finally around the question of the ultimate worth of life itself (Dobzhansky, 1967). Possible answers become relative with alternatives that call for assessment within some larger ethic yet to be found. What is needed ideally, of course, to make decisions in these areas is a consensus on some supreme comprehension and interpretation of the universe and the place and role within it of man and the life experience.

The same position is reached by way of abstract value theory, in which it is shown that values depend largely on goals, and that any concept or belief regarding the goal and value of life as a whole, once accepted, then logically supersedes and conditions the entire hierarchy of value priorities at all subsidiary levels (Sperry, 1972). Values at the ideological plane become ordered, and ethical issues judged, in accordance with the conceived ultimate goal and purpose of life as a whole. This latter will logically imply in turn an associated world view or universe scheme that is consistent.

By one route or another we come down to these prime determinants of value priorities—these "life goal," "world model" concepts and beliefs, explicit or implied, that lie at the heart of the problem of moral judgment and pose the central challenge. This is where the great unknowns lie and also where the great differences of opinion are found. This is where answers are most needed and where any answers, right or wrong, once accepted, have the greatest impact. And it is here also that the competence of science in the arena of values and any new ethic must eventually be proven. The scientist, trained to rigorous reasoning and skepticism, to checking against detailed empirical evidence, and above all to avoiding false conclusions, may easily be persuaded at this point that value problems are not for science. It must, however, be remembered that final, absolute, or perfect answers are not demanded, only improved ones, and that society has in the past and probably will continue in the future to find and abide by some kind of answers from somewhere. The question is not whether science can provide final, complete, or perfect answers, but whether there is any alternative that does as well by long-term, "future generation" standards.

The supreme ultimate authority, reference, or determinant of what is ethically and morally good, right, and true that has been most widely and commonly recognized throughout history has been the concept, in various forms, of man's creator and the cosmic forces that move and control the universe. In the eyes of science, to put it simply, man's creator becomes the vast interwoven fabric of all evolving nature, a tremendously complex concept that includes all the immutable and emergent forces of cosmic causation that control everything from high-energy subnuclear particles to galaxies, not forgetting the causal properties that govern brains and behavior at individual and social levels. For all of these, science has gradually become our accepted authority, offering a cosmic scheme that renders most others simplistic by comparison.

Changing to an ethic based in science would entail in large part a substitution of the natural cosmos of science for the different mythological, intuitive, mystical, or "other-worldly" frames of reference by which man has variously tried to live and find meaning. World-view concepts setting the parameters for higher meaning would then need to be reinterpreted in terms of the facts, insights, and truths (revelations) of science, and the consequent value-belief implications analyzed and formulated. A very similar approach and set of reformulations is arrived at from other sources by Burhoe (1975), who describes the effort as "scientific theology."

It follows accordingly on the above terms that what is good, right, or to be valued is defined very broadly to be that which accords with, sustains, and enhances the orderly design of evolving nature. Conversely, whatever is out of line, degrades, or destroys nature's grand design is wrong or bad. The reference is not to the innumerable subsystems within subsystems of the natural order but to the overall "grand orderly design" perceived in a long-term perspective, with special focus on evolution in our own biosphere.

It is to be expected that one may see at first glance many apparent difficulties and contradictions in attempting to find ethical guidelines in the principles that function in evolution and have succeeded in creating man. However, difficulties

and contradictions are found in any system of ethics used to date. Christian doctrine, for example, is full of moral contradictions. The aim is not to eliminate value controversy and differences of opinion but only to bring these and the resultant decisions into a domain set by an agreed-upon frame of reference supported by science—not with the idea that scientific truth is absolute or beyond question, but only with a conviction that it does represent the best and most reliable, credible, and dependable approach to truth available.

The result, predictably, would not much alter the bulk of present, personal, day-to-day values nor many of the traditional moral and ethical teachings concerning interpersonal conduct that have proven themselves throughout history. At the same time, significant changes would be expected in areas more directly dependent on world-view perspectives. An increased respect and reverence for all nature and for what is sometimes referred to as the "infinite wisdom of nature" may be directly inferred along with added concern for the balance, progressive differentiation, and quality of the ecosystem as a whole. Things such as the recycling philosophy, species' rights, conservation of natural resources, and the control of population explosions become reinforced with a higher kind of dedication and commitment beyond mere human expediency.

Although man, as part of evolving nature and at the peak of the evolutionary scale, remains the prime consideration, mankind does stand to lose some of the uniqueness and "measure of all things" status accorded in some previous systems. A sense of higher meaning is preserved with a meaningful relation to something deemed more important than the human species taken by itself.

However, this is not the place to attempt to undertake the enormous task of trying to analyze and define the particular kinds of social value changes that might be incurred in the adoption of an ethic based on science. The present aim is only to help justify and clear the way by trying to remove a first major hurdle. Once it can be shown to be intellectually respectable to apply science in the realm of value judgment, thinking along these lines will begin to develop on many fronts.

Looking ahead, it may be remembered in this connection that social decision-making does not require, and frequently does not involve nor wait on, precise logical answers or directives, but proceeds on the basis of vague impressions, personal biases, emotional leanings, general attitudes, and the like. This is why any change achieved in the prevailing public attitude on the relation of science to values and higher meaning that may help to counter antiscience and reductionist fallacies, even though it remain only a vague impression in the minds of most of the voting majority, nevertheless carries enormous decisional consequence. The pervasive impact via a vast complex of societal decisions affecting population policy, global conservation, and related ecosystem planning generally, adds up to an overall potential benefit far exceeding that of many other top scientific goals—such as conquering cancer or schizophrenia—especially from the standpoint of coming generations.

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